

# PATENT SPECIFICATION



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762,640

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## COMPLETE SPECIFICATION

### Improvements in or relating to Hermetically Sealed Electrical Components

5 We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of Connaught House, 63 Aldwych, London, W.C.2, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to an electrical unit apparatus such as, for example, a capacitor, hermetically sealed in a container. More particularly, it relates to a means of providing such a unit apparatus with silvered ceramic or like terminals projecting through said container, the container having a filling of oil or of like material.

15 It is preferable in such cases to avoid the use of solder tags and to make use of wire leads to connect the said unit to the rest of the apparatus and it is an object of this invention to provide an electrical unit apparatus, such as a capacitor, in a hermetically sealed container filled with oil or like material and to provide said unit with a modified form of silvered ceramic or like terminal to meet these requirements.

20 Moreover, although it is commonplace to connect a terminal tag or terminal lead to a silvered ceramic surface or to seal a ceramic terminal bush or post or pillar into an aperture in a container for an electrical unit apparatus, such as a capacitor, by the use of solder, when a wire is soldered in the normal course of wiring to a terminal tag or lead on a ceramic bush or post or pillar sweated into an aperture of a container, the heat used will endanger the joint between the terminal insert and the ceramic insulator and may well in addition tend to melt the solder securing the bush or post or pillar to the said container. Also when it is necessary to use a terminal lead instead of terminal tags there is, in use a greater tendency for the terminal lead wire to break by flexing. Such breakage, moreover, when occurring inside the container makes the otherwise useful unit apparatus valueless.

25 It is a further object of this invention to provide means for avoiding breakage by flexing,

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by supporting the wire terminal in the ceramic tube for some distance from the soldered joint to the container and to provide oil immersion of the seal so that the soldering of the external leads to said unit can be carried out with safety and without disrupting the seal.

30 In British Patent Specification No. 634,544 there has been described and claimed an electrical unit apparatus comprising an electrical component in a sealed container with a filling of oil or like material and with at least one insulating part hermetically sealed to and projecting substantially wholly internally within said container, each said part being provided with an aperture extending from the interior to the exterior of the said container, a connection for said electrical component electrically connected thereto and passing through said aperture to the exterior of said container, said connection being sealed to said part by a hermetic seal to that portion projecting within said container.

35 The present invention is a modification of and an improvement in the invention claimed in the above mentioned specification.

40 According to the present invention there is provided an electrical unit apparatus comprising an electrical component in a sealed container with a filling of oil or like material and with at least one insulating part hermetically sealed to and projecting externally and internally of said container, said part being provided with an aperture extending from the interior of the exterior of said container, a connection for said electrical component electrically connected thereto and passing through said aperture to the exterior of said container, said connection being sealed to said part by a hermetic seal, in which said insulating part is provided with a silver coating on said portion thereof.

45 There is thus provided a construction in which the advantages of the earlier construction that the seal is immersed in oil and that the terminal wire is supported, are retained, and which provides the improvement that a higher impedance leakage path from the terminal wire to the exterior of the container is provided.

The invention will now be described with reference to the accompanying drawings in which:—

Fig. 1 shows one embodiment of the invention in part sectional elevation;

Fig. 2 shows a plan view;

Fig. 3 shows a further embodiment of the invention in part sectional elevation;

Fig. 4 shows an end view of the embodiment of Fig. 3.

Referring first to Figures 1 and 2, a metal case or container 1, containing an electrical component 2, is of boxlike formation having a rectangular cross-section with rounded edges and has in this example two apertures 3, 4, on one face or side 5 thereof. Two ceramic bushes 6 and 7 each metallised or silvered around the middle are inserted via said apertures 3 and 4 respectively into the container 1 with the metallised or silvered band on each of said bushes adjacent to the container face 5 with the bush projecting externally and internally of the container as shown in Fig. 1. Each of the said ceramic bushes or tubes 6, 7 will also be metallised (e.g. silvered) at one end and will be so inserted into the container 1 that this silvered end is inside the container nearer to the said electrical component 2. Each of the said apertures 3 and 4 is at the bottom of a shallow recess, 8 and 9 respectively, pressed into the said face 5 of the container 1 so that each of the said ceramic bushes can be inserted into the said container until the top of its respective metallised band is level with the said face 5 of the container 1. Each of said ceramic bushes 6 and 7 is provided with a central aperture indicated as 12 and 13 (Fig. 2) respectively through which the terminal stems 14 and 15 form connections to the said electrical component 2 via the terminals 16, 17 respectively within the container 1. The terminal stems may each take the form of a solid wire conductor such as for example tinned copper wire or a flexible wire conductor e.g. tinned copper stranded wire or a screwed terminal stem, the metal in each case being preferably of soft or medium temper and dimensioned to form a neat fit in the said central apertures in the ceramic bushes. On insertion into the apertures, each of the said stems is sealed in by soldering to the inner end of its respective ceramic bush as shown at 20, 21 (Fig. 1) each stem being further preferably flexed or bent as shown at 18, 19 in a slow curve nearer the end to which the electrical component 2 is to be coupled, the terminals 16, 17 of the said electrical component being connected or coupled to the said stems 14, 15 respectively in any known manner e.g. by soldering as shown in Fig. 1. The electrical unit apparatus is completely assembled, oilfilled and sealed according to known practice. The terminal stems 14, 15 may be cut off to any desired length at their respective external ends.

It will thus be seen that this arrangement

provides adequate support to the terminal stems against breakage by flexure as each ceramic bush, and therefore its central aperture is made of adequate length. Said support of the stems depends upon the length of the said central apertures which is governed by the distance of the soldered joint e.g. 20, 21 (Fig. 1) to the point where the stem leaves the ceramic bush or tube. Moreover the internal joints 20, 21 and those made with terminals 16, 17 will be oil immersed and any heat transmitted via the terminal stems 14, 15 during connection of the said component 2 to an external circuit will not in any way distort or destroy said joints.

In the embodiment of Figs. 3 and 4 is shown an electrical component 22, such as for example a tubular condenser, contained in a split case metal tube container 23 (Fig. 4) connections being made to external circuits via axial terminal stems 24, 25 similar to 14, 15 (Fig. 1). The stem 24 is conductively connected directly to, in this example, a metal disc 26 at 27. The said metal disc is then soldered or jointed conductively in any known manner to the end 28 of the said container 23. One end of the said condenser is connected directly either to the said container and/or to the said disc. The other end 29 of the said container has a circular ceramic bush 30 which has a central aperture 31 and is similar to those described in connection with Figs. 1 and 2 except that it has a wider centre portion. The terminal stem 25 is assembled, by insertion into the said bush 30 and soldered onto its inner end at 32. The outer edge of the said bush is soldered to the said container 23 at the end 29. The axial terminal 34 of the tubular condenser 22 is then connected to the inner end of the said terminal stem 25. The electrical unit apparatus is assembled, oil-filled and sealed as mentioned, in connection with the embodiment of Figs. 1 and 2. For the purpose of the oil-filling and sealing operation an aperture may conveniently be made on the body of the container in the case of each of the embodiments which will finally be sealed by soldering in any known manner.

The description given above has mainly been directed towards demonstrating the connections of the electrical component in a container to its terminal stems. According to the principles of the present invention, in the case of the embodiment of Fig. 1 and 2, both the terminals are insulated while in the case of that of Figs. 3 and 4 one terminal may be for the earthy connections.

All operations for assembly not directly related to the explanation of the present invention have been described only in outline to avoid confusion.

While the principles of the invention have been described in connection with specific embodiments it is to be clearly understood that this description is made only by way of example.

Although the externally projecting insulating portions have been shown to have a smooth

surface, the length of the surface from the terminal wire to the container may be increased in any known manner, for example by providing serrations in the surface.

5 What we claim is:—

1. An electrical unit apparatus comprising an electrical component in a sealed container with a filling of oil or like material and with at least one insulating part hermetically sealed to and  
10 projecting externally and internally of said container, said part being provided with an aperture extending from the interior to the exterior of the said container, a connection for said electrical component electrically connected  
15 thereto and passing through said aperture to the exterior of said container, said connection being sealed to said part by a hermetic seal to that portion projecting within said container, in which said insulating part is provided with a  
20 silver coating on said portion thereof.

2. An electrical unit apparatus according to claim 1 wherein said insulating part comprises a ceramic tube.

3. An electrical unit apparatus according to claim 1 wherein said insulating part comprises  
25 a tubular ceramic bush having a wider central portion which seals one end of said container.

4. An electrical unit apparatus according to claim 1 wherein said container comprises two  
30 of said insulating parts, one connection being sealed to each of said two parts and to each one of the terminals of said component.

5. An electrical unit apparatus according to claim 3 wherein said container is tubular  
35 comprising one insulating part, one connection only being sealed to said insulating part and to one terminal of said component, the other terminal being connected, and sealed to said  
40 container.

6. Electrical unit apparatus substantially as hereinbefore described with reference to  
Figures 1 and 2 or to Figures 3 and 4 of the  
accompanying drawings.

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FIG. 1.

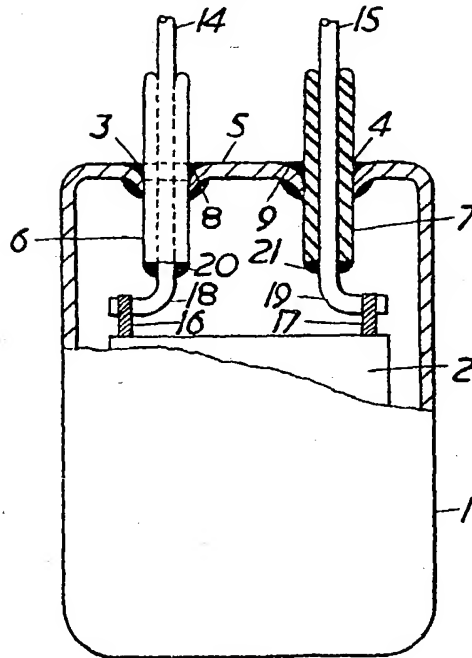


FIG. 2.

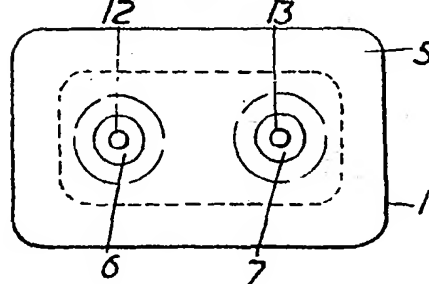


FIG. 3.

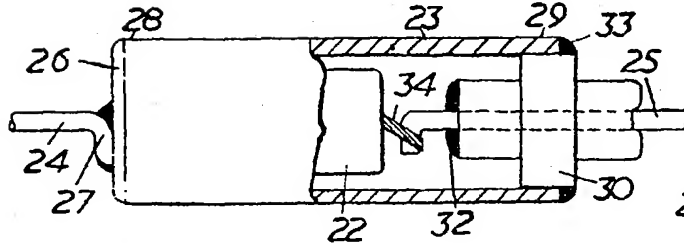


FIG. 4.

